

### Remarks/Arguments

Claims 1-5 are pending in the application. By this Amendment, the specification is amended and Figures 5 and 6 are replaced.

Page 2 of the Office Action rejects claims 1 and 4 under 35 USC §102(a) by the acknowledged prior art of Figure 4 of the application and asserts that Figure 4 is identical to the invention. The rejection is respectfully traversed.

The Office Action states that the acknowledged prior art as illustrated in Figure 4 is identical to that of the exemplary embodiment of the invention illustrated in Figure 5. Applicant respectfully submits that the description of the invention given in paragraphs 25 and 26 of the specification delivers enough detail to sufficiently show the differences and benefits of the invention over the acknowledged prior art. Applicant surmises that this rejection may have been caused by the inadvertent use of identical part numbers in the acknowledged prior art of Figure 4 and the exemplary embodiments of the invention illustrated Figures 5 and 6. The relevant part numbers have, by this Amendment, been changed in the specification and in Figures 5 and 6. No new matter is added as the original specification included a description of the invention; only the part numbers have changed.

As stated in paragraph 24 of the specification, "The present invention improves upon the prior art hydraulic circuit 10 illustrated in Figures 1 - 4 to reduce the occurrence of cavitation during the float condition." Amended paragraphs 25 and 26 now read:

**[0025]** Figure 5 illustrates a first embodiment of the present invention. In this embodiment, the flow area of the first passageway 162 on the valve spool 142 is appropriately sized to reduce hydraulic fluid flow from the head end port 30 of the hydraulic cylinder 16 to the hydraulic fluid reservoir 18, such that a sufficient proportion of the hydraulic fluid expelled from the head end port 30 flows through the supply passage 154 of the control valve 14 and back to the rod end port 26 to reduce cavitation when the valve spool 142 is in the "float" position. For example, the first passageway 162 may be sized such that the ratio of flow through the second return port 52 compared with the flow through the second work port 48 is approximately the ratio of the square of the rod cylinder 22 diameter to the square of the cylinder body 20 diameter.

**[0026]** Figure 6 illustrates a second embodiment of the present invention. In this embodiment, the second passageway 268 on the

valve spool 242 is blocked-off, eliminating the flow path for hydraulic fluid to flow between the hydraulic fluid reservoir 18 and the rod end port 26 of the hydraulic cylinder 16 when the valve spool 242 is in the "float" position. Additionally, the flow area of first passageway 262 on the valve spool 242 is appropriately sized to reduce hydraulic fluid flow from the head end port 30 of the hydraulic cylinder 16 to the hydraulic fluid reservoir 18, such that a sufficient proportion of the hydraulic fluid expelled from the head end port 30 flows through the supply passage 254 of the control valve 14 and back to the rod end port 26 with minimal cavitation when the valve spool 242 is in the "float" position.

As reflected in paragraphs 25 and 26 the difference between the invention and the prior art is the sizing of the passageways on the spools to prevent/reduce cavitation during the float condition. In other words, the invention allows cavitation control to be built into a spool valve by adjustments to the sizes of the passageways. Further, Figures 5 and 6 clearly show differences between the sizes of the necks at passageways 160, 162, 164, 166, 168, 260, 262, 264 266, and 268 of the invention and the sizes of passageways 60, 62, 64, 66 and 62 of the acknowledged prior art.

Claim 1 recites, inter alia, "...the improvement to the hydraulic directional control valve comprising: the first passageway on the valve spool being sized such that the flow of hydraulic fluid through the second work port is discouraged, and that the flow between the second work port and the first work port is encouraged, when the valve spool is in the float position." Thus, claim 1 clearly recites the difference, i.e., the difference and improvement of the invention over the acknowledged prior art as sizing the first passageway to discourage flow to the second work port and encourage flow between the second work port and the first work port. The acknowledged prior art does not disclose this feature.

Claim 4 recites, inter alia, "... the improvement to the hydraulic circuit comprising: the first passageway on the valve spool of the hydraulic directional control valve being sized such that the ratio of flow through the second return port compared with the flow through the second work port is approximately the ratio of the square of the rod cylinder diameter to the square of the cylinder diameter, when the valve spool is in the float position." Thus claim 4 clearly recites the improvement of the invention over the acknowledged prior art as a sizing of the first passageway as does claim 1. However, claim 4 recites the sizing more specifically. The acknowledged prior art does not disclose this feature.

It is respectfully requested that the rejection of claims 1 and 4 under 35 USC

102(a) as anticipated by the acknowledged prior art be withdrawn.

Page 2 of the Office Action rejects claims 2, 3 and 5 under 35 USC 103(a) as unpatentable over the acknowledged prior art of Figure 4 of the application. The rejection is respectfully traversed.

As demonstrated above, claims 1 and 4 define over the acknowledged prior art. Thus, claims 2, 3 and 5 define over the acknowledged prior art as these claims depend from claims 1 and 4 and recite additional features. Further, MPEP 706(j) states, inter alia:

“...To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicants disclosure.” (Emphasis added)

Applicant respectfully submits that the features recited in claims 2, 3 and 5 are not found in the acknowledged prior art, a fact admitted in the Office Action.

Page 3 rejects claims 1-5 under 35 USC 112, first paragraph. The rejection is respectfully traversed.

The Office Action states that the invention is not enabled because Figure 4 (the acknowledged prior art) is identical to Figure 5. Applicant respectfully submits that the drawings were sufficiently described in the original application, i.e., paragraphs 25 and 26, to note the differences. Applicants submit that the numbering scheme for the parts caused the confusion as it may have indicated the parts were the same. Figures 5 and 6 are amended to agree with paragraphs 25 and 26 of the specification and to more clearly illustrate the differences between the invention and the acknowledged prior art. No new matter is added as the original specification included a description of the invention; only the part numbers have changed.

For at least the reasons set forth above, Applicant respectfully submits that the application defines patentable subject matter. Favorable reconsideration and prompt allowance of claims 1 - 5 is respectfully solicited.

Should Examiner Michalsky believe anything further is desirable in order to place the application in even better condition for allowance, he is invited to contact Applicants' undersigned representative at the telephone number listed below.

Any fees or charges due as a result of filing of the present paper may be charged against Deposit Account 04-0525. Two duplicates of this page are enclosed.

Respectfully,

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Cassie Fitchner 02 February 2005  
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# APPENDIX

# Replacement Sheets

**Amendments to the Drawings**

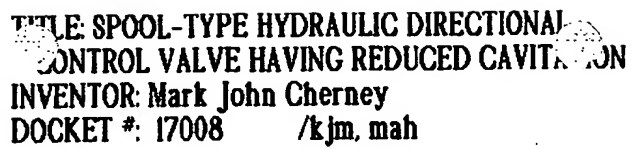
The attached sheets of drawings include changes to Figures 5 and 6.

Attachment: Replacement Sheets  
Annotated Sheets Showing Changes

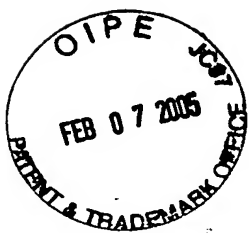


# Annotated Sheets Showing Changes





**FIG. 5**



TITLE: SPOOL-TYPE HYDRAULIC DIRECTIONAL  
CONTROL VALVE HAVING REDUCED CAVITATION  
INVENTOR: Mark John Cherney  
DOCKET #: 17008 /kjm, mah

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